LAURENCE G. HANSCOM FIELD

2009-2013 VEGETATION MANAGEMENT PLAN

March 2009 **DRAFT** Supplement
To include Vegetation Management Area 17
within the Runway 23 Approach

Stantec

massport

Table of Contents

1.0 Introduction

1.1 BACKGROUND

This document is a supplement to the recent *Laurence G. Hanscom Field 2009-2013 Vegetation Management Plan November 2008 Update.* It provides details for work within Vegetation Management Area 17 within the Jordan Conservation Area owned by the Town of Bedford.

In March 2002, Massport prepared a Vegetation Management Plan (VMP) to guide the maintenance of protected airspace at L.G. Hanscom Field. The VMP was designed to serve as a guide for current and future vegetation removal projects conducted at the airport. This overall guidance document provides necessary background information for each permitting and maintenance cycle that will occur on an approximately 5-year basis as updates to the airspace analysis and project environmental permitting are completed. Upon completion of each cycle, the VMP is updated to reflect changes in site conditions, lessons learned from previous removal projects, and changes in regulations. The majority of the VMP information will remain per the original document.

A November 2008 Update of the Vegetation Management Plan for L.G. Hanscom Field was prepared by Massport entitled *Laurence G. Hanscom Field 2009-2013 Vegetation Management Plan November 2008 Update.* It was the first update to the original VMP completed in 2002 and reflects information obtained and lessons learned as a result of the initial removal project and associated maintenance program implemented from 2003 through 2007. Massport provided copies of the updated document to the four abutting towns' conservation commissions as part of the permitting process which was completed in early 2009. The review process for the November 2008 Update included an advertised public meeting. Further comment was received during permitting with each of the four area towns.

This (DRAFT) Supplemental Vegetation Management Plan (SVMP) is submitted to the Town of Bedford to provide additional detail on Vegetation Management Area (VMA) 17 of the *Laurence G. Hanscom Field 2009-2013 Vegetation Management Plan November 2008 VMP Update.* VMA 17 was made a part of the original and updated VMPs, but was not discussed in detail since Massport does not own or have easements over the subject area. Past and recent aerial photogrammetry identified significant vegetative obstructions to protected airspace associated with Runway 5-23 in VMA 17, requiring immediate action on the part of Massport to address the obstructions. Massport staff met informally with the Town of Bedford staff and officials to identify an acceptable process of planning for the removal of the obstructing vegetation. The submission of this (DRAFT) SVMP is an important step in working with the Town and its conservation commission in maintaining the protected airspace of Runway 5-23 within VMA 17.

This SVMP is intended to be a part of the November 2008 VMP Update. The information contained in the November 2008 VMP Update provides the base information on overall

vegetation management at the airport, and all sections should be considered to be pertinent to this SVMP. Narratives in this SVMP are provided where new information is necessary, or for added emphasis. Refer to the November 2008 VMP Update for base information.

The purpose and goals of this SVMP are fully consistent with those presented in Chapter 1 of the November 2008 VMP Update. However; due to the heightened sensitivity of VMA 17 (wetlands and conservation area), the Purpose and Goals are amended to include the following statement:

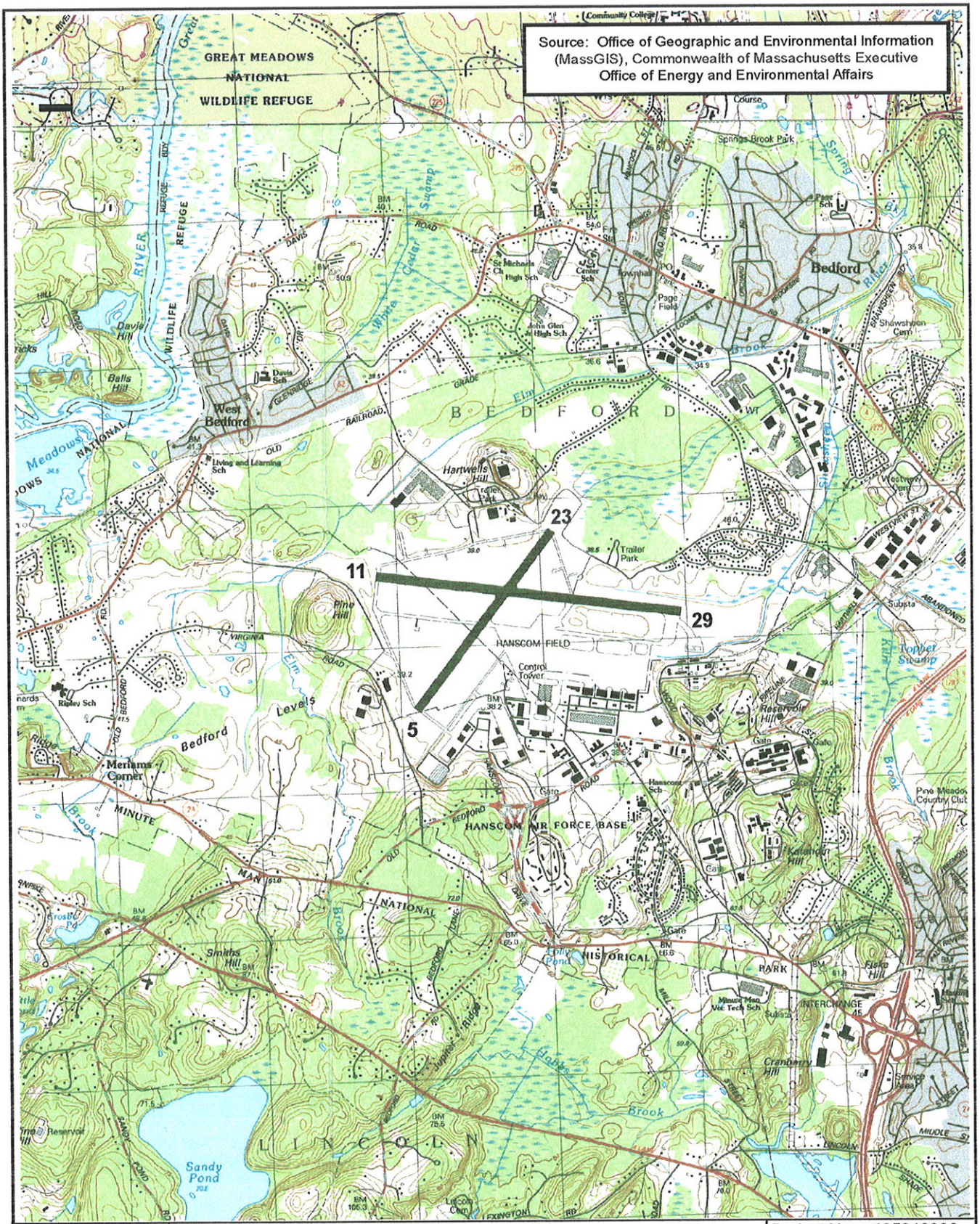
> Massport recognizes the public and wildlife benefit afforded by the Jordan Conservation Area and VMA 17 due to its status as a protected wetland resource and as a public access property whose principle function is the conservation of natural resources. To that end, Massport is committed to the selection of removal and maintenance techniques that give added weight to the protection of the natural resources as long as the VMP Purpose and Goals can be met and a safe airspace established.

To this end, the proposed removal techniques specified for the Jordan Conservation Area focus on maintaining as many canopy trees as possible while addressing the obstruction issues. Through exact target identification and frequent management, the existing vegetative condition of each of the four removal areas addressed herein can be substantially retained. The combination of these sensitive techniques and the proposed mitigation measures should minimize any long-term effect on the existing vegetative communities.

Target specificity will be achieved by combining the current photogrammetry with ground-based survey during the actual obstruction removal. Since complete conversion to a low-growing community is not proposed in the current removal areas in VMA 17, trees that do not yet penetrate (or are within 15 feet of penetrating) will remain intact. The only way to quickly confirm this during removal is to site each tree and conduct the necessary computations as the work proceeds. In this manner, maximum protection of non-obstructions is achieved.

1.2 SETTING

This SVMP is pertinent to VMA 17, located at the Runway 23 end in the Town of Bedford; see ***Figure 1-1***. Current obstruction areas within VMA 17 include those within the Jordan Conservation Area (see plan in ***Appendix 3***). This public access site is owned and managed by the Town of Bedford. It consists of forested wetlands and uplands surrounding the headwaters of Hartwell Brook. Access to the property is off of Hartwell Road. The conservation area abuts Massport property as shown on the plan.



Stantec Northampton, Massachusetts Tel. (413) 584-4776 www.stantec.com	L.G. HANSCOM FIELD VEGETATION MANAGEMENT PLAN **SITE LOCUS** **FIGURE 1-1** BEDFORD MASSACHUSETTS	Project No. 195210330 Proj. Mgr. SGL Scale 1" = 3000' Date SEPT. 2008 A

The four areas of interest are located to the east and west of a central emergent marsh created primarily through beaver activity. This central area lacks any significant woody vegetation, consisting mainly of open water and herbaceous species. The land rises slightly to the west (towards Hartwell Road and the associated residential properties) and to the east towards other Massport property. This slight rise in elevation has allowed for trees to establish, resulting in the obstructions to navigable airspace that are the subject of the SVMP. Most of the obstructions are the taller White Pine (*Pinus strobus*) that grow along the wetland fringe and in the upland. At the southern boundary of the VMA adjacent to Massport property, lower trees also penetrate the airspace, resulting in some deciduous trees in the obstruction mix. Species such as Red Maple (*Acer rubrum*) and Quaking Aspen (*Populus tremula*) are target species in this zone.

The current obstruction areas within the Jordan Conservation Area occur within four distinct sites. They are similar in vegetative condition to communities managed on Massport property as approved through previous permitting efforts with the Bedford Conservation Commission. These are shown on the plan and further described in Section 4.0 of this SVMP.

1.3 GENERAL INFORMATION

Airport Name	L.G. Hanscom Field
Airport Location	Bedford, Concord, Lexington, Lincoln - Massachusetts
Contact Person	Mr. Tom Ennis, Senior Project Manager/Senior Planner Telephone: (617) 568-3546
Airport Owner	Massachusetts Port Authority (Massport)
Owner Address	One Harborside Drive East Boston, MA 02128-2909
Airport Director	Ms. Barbara Patzner Massport Civil Air Terminal 200 Hanscom Drive Bedford, MA 01730 Telephone: (781) 869-8000

1.4 SVMP PLAN

The enclosed plan contains numerous numbered obstruction points indicating the tallest obstruction within a 50'x50' grid. Data on the numbered obstructions is provided in Appendix 2 of this SVMP. These numbered obstructions have been tagged at the project site. It is estimated that an additional 2 to 2.5 obstructions occur for every numbered obstruction in the

grid. The SVMP plan should thus be considered to show a subset of the total obstructions, with the 2 to 2.5 multiplier used to estimate the total number of trees involved with this management plan.

2.0 Airport Protection Zones

Chapter 2 of the November 2008 VMP Update provides a description of protected airspace around L.G. Hanscom Field. As this SVMP is relative to the Runway 23 end, the focus is on FAA Order 8620.3B, *U.S. Standard for Terminal Procedures (TERPS).* A copy of this FAA Order was provided to the Bedford Conservation Commission. It is available on-line at FAA.gov using the FAA Order identifier.

The FAA and Massport coordinated on the analysis of the airspace at the Runway 23 end and agreed that the airspace off of the Massport property could be cleared to the 20:1 TERPS surface to preserve existing operational capacity. The instrumentation and usage of the runway would typically dictate clearing to a 34:1 approach slope per the current FAA regulations, thus the 20:1 allowance represents a significant reduction in the extent of vegetation management required off of the Massport property at the Runway 23 end. The edge of the 20:1 TERPS surface is shown on the enclosed plan. The Notice of Aeronautical Determination from the FAA (February 6, 2006) allowing for the clearing of the 20:1 TERPS surface off of the airport property is included in ***Appendix 1*** of this SVMP. The obstruction tables in ***Appendix 2*** are based on the elevation of this 20:1 TERPS surface. Some limited removal of obstructions to the 7:1 FAA Part 77 Transitional surface is proposed in Areas 1 and 2. This would allow for the removal of the obstruction light poles in the Jordan Conservation Area. Those obstructions pertinent to this transitional surface are noted on the spreadsheet in ***Appendix 2***, and are clearly shown on the plan beyond the TERPS 20:1 boundary in Areas 1 and 2.

3.0 Sensitive Environmental Resources

Preparation of this SVMP for VMA 17 involved the investigation of various environmental resources which could affect the design of the vegetation management program for Areas 1 through 4 within the Jordan Conservation Area. Data were collected from state, federal, and municipal agencies as well as from field research. The following is a list of protected environmental resources investigated as part of the preparation of this SVMP.

- Rare and Endangered Species (state and federal)
- State and Federal Wetland Resources
- Areas of Critical Environmental Concern (state-defined)
- Wild and Scenic River Corridors (U.S. Dept. of the Interior)
- Drinking Water Supplies (Massachusetts Water Quality Classification)
- Nuisance Vegetation
- Steep Slopes
- Organic Soils
- Historic/Archaeological Resources
- Closed Landfill Areas

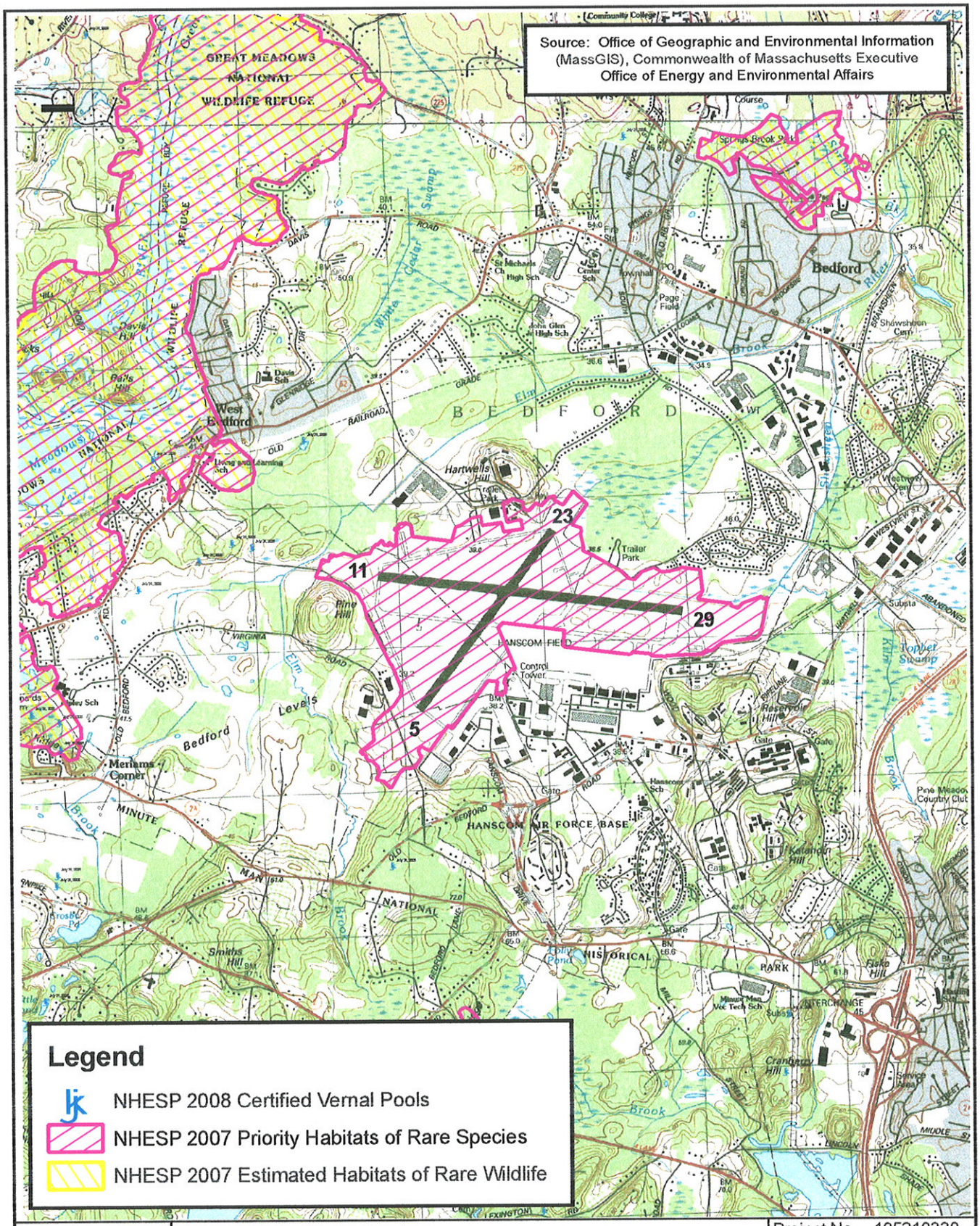
Table 3-1 provides a summary of the results of the environmental resources investigation for VMA 17.

TABLE 3-1: SUMMARY OF THE ENVIRONMENTAL CONSTRAINTS IN VMA 17

Protected Resource	Present or Absent at the Airport	Comments
Rare and Endangered Species	Absent	No state or federal rare or endangered species are currently known to occur within the limits of VMA 17
State / Federal Wetlands	Present	Full delineation of wetlands within VMA 17 will be completed during the 2009 growing season (after April 27, 2009. The surveyed wetland boundary will be added to the plan in this SVMP.
Areas of Critical Environmental Concern	Absent	No ACECs occur within the project area according to the Department of Conservation and Recreation (formerly Ma. Dept. of Environmental Management).
Wild and Scenic Rivers	Absent	The Shawsheen River and tributaries (including Hartwell Brook) are not listed as Wild and Scenic by the National Park Service (NPS) according to the most recent update of the NPS database.
Public Water Supplies	Absent	Hartwell Brook and the associated wetlands in VMA 17 are not shown to occur within the Zone II of a public water supply.
Nuisance Vegetation	Present	European Buckthorn and Purple Loosestrife exist within both wetland and upland areas within VMA 17. Buckthorn is a dominant shrub in most upland and wetland wooded areas of the airport property.
Steep Slopes	Absent	The topography within VMA 17 is level throughout.
Organic Soils	Present	The central emergent marsh in VMA 17 contains organic soils. No machinery access can be gained through any portion of the marsh, as these soils will not freeze under normal winter conditions.
Historical/Archeological Resources	Absent	VMA 17 is not known to be sensitive for any historical resources. No soil alterations that may disturb unknown archeological resources will occur.

3.1 RARE AND ENDANGERED SPECIES

The most recent edition of the Massachusetts Natural Heritage Atlas (2008) was consulted to determine whether this proposed SVMP will adversely impact any state-listed rare or endangered wildlife species. The Atlas indicates that no rare species or certified vernal pools are currently known to occur at the Runway 23 end within VMA 17 (***Figure 3-1***). There are no federally-listed species known to occur at the airport.



Stantec
Northampton, Massachusetts
Tel. (413) 584-4776
www.stantec.com

L.G. HANSCOM FIELD
VEGETATION MANAGEMENT PLAN
ESTIMATED AND PRIORITY HABITATS
FIGURE 3-1
BEDFORD MASSACHUSETTS

Project No.	195210330
Proj. Mgr.	SGL
Scale	1" = 3000'
Date	SEPT. 2008
A	

3.2 STATE AND FEDERAL WETLAND RESOURCES

VMA 17 consists mainly of state and federal vegetated wetland with some open water area from beaver impoundments of Hartwell Brook. The wetland edge is to be delineated at the start of the 2009 growing season (after April 27, 2009) according to the *Federal Manual for Identifying and Delineating Jurisdictional Wetlands (1987)* and the manual *Delineating Bordering Vegetated Wetlands pursuant to the Massachusetts Wetlands Protection Act (1995)*. Sequentially numbered wetland flags will be survey located and placed on the removal plan for VMA 17.

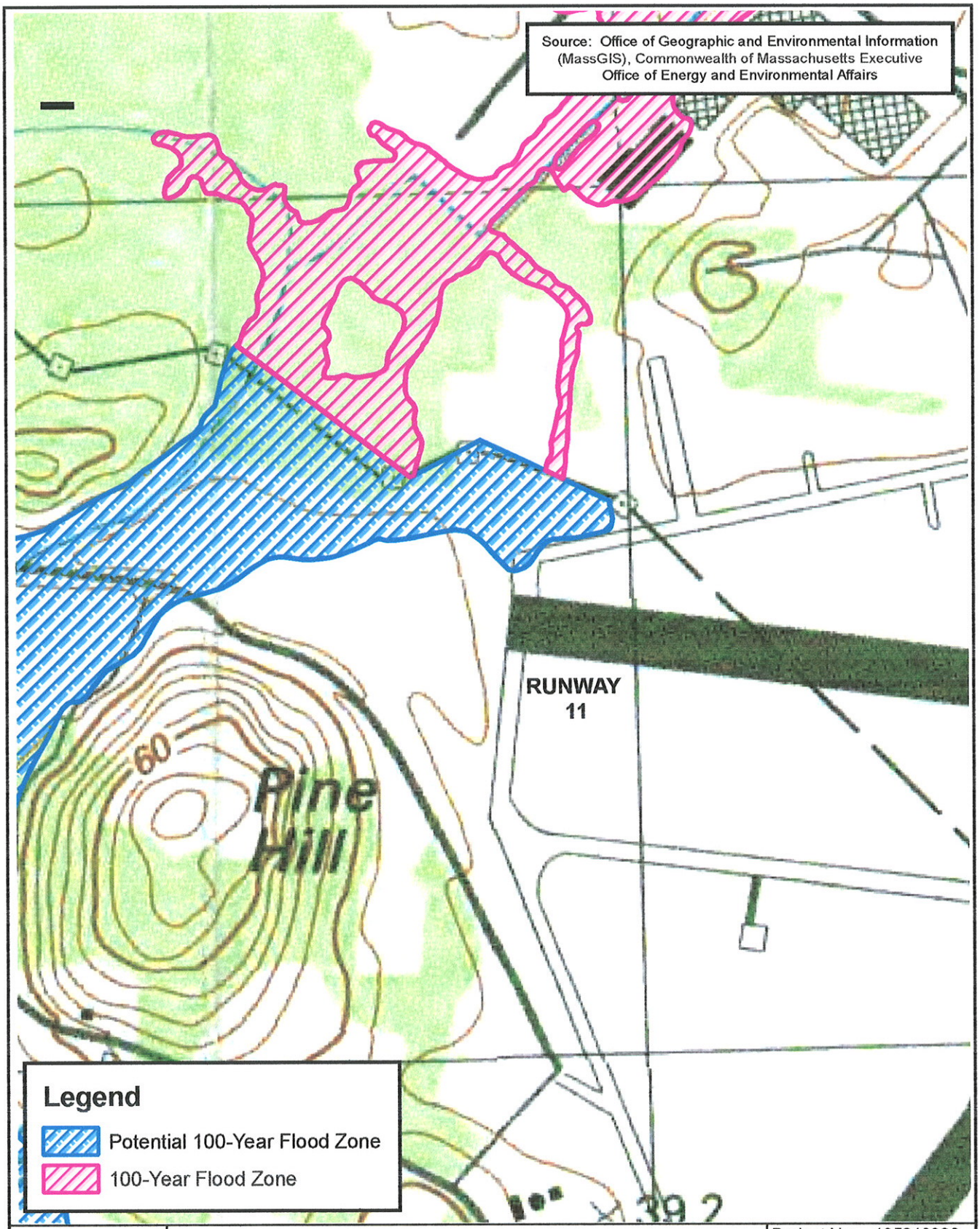
In addition to the edge of vegetated wetland, there exist other State-level wetland resources within VMA 17. Hartwell Brook occurs in the northern section of VMA 17 and a portion of the riverfront area of this perennial stream may influence the northwest portion of Area 2. The brook bank as defined in the Massachusetts Wetlands Protection Act Regulations (310 CMR 10.58(2)) will be delineated and surveyed during the 2009 growing season. This bank delineation will be used to determine the limits of the 200-foot riverfront area. The origin of the perennial section of Hartwell Brook will be difficult to define. Beaver dams and former cranberry ponds obscure the upper sections of the channel close to the Runway 23 end. These open water areas do not contain obvious flowing water. Only at the final dam is there a clear channel containing perennial flow. This headwater area will be closely inspected during the bank delineation and a field determination made based on the criteria in the riverfront area section of the regulations. The criteria will be documented with both narrative and photographs.

No other State-level wetland resource areas occur within the proposed removal areas within VMA 17. The current FEMA floodplain maps for the VMA do not indicate the presence of 100-year floodplain at the Runway 23 end. Only Elm Brook, which begins at the Runway 11 end and extends to the far approach of the Runway 23 end, is shown to contain floodplain within the vicinity of the proposed removal areas in VMA 17 (**Figures 3-2 and 3-3**).

3.3 DRINKING WATER SUPPLIES AND OUTSTANDING RESOURCE WATERS

The on-site waterways are listed as Class B waters according to the most recent edition of the Massachusetts Surface Water Quality Standards indicating that they are not used as public drinking surface water supplies. No Outstanding Resource Waters pursuant to Section 401 of the Federal Clean Water Act were identified within VMA 17.

The Town of Bedford maintains only three public water supply wells located along Shawsheen Road near the Page Road intersection. The proposed removals in VMA 17 are located outside of the Zone 1 and Zone II boundaries of this wellfield. The remaining Town water is provided by the Massachusetts Water Resources Authority (MWRA). No private potable water supply wells were identified within the Town of Bedford adjacent to the site.

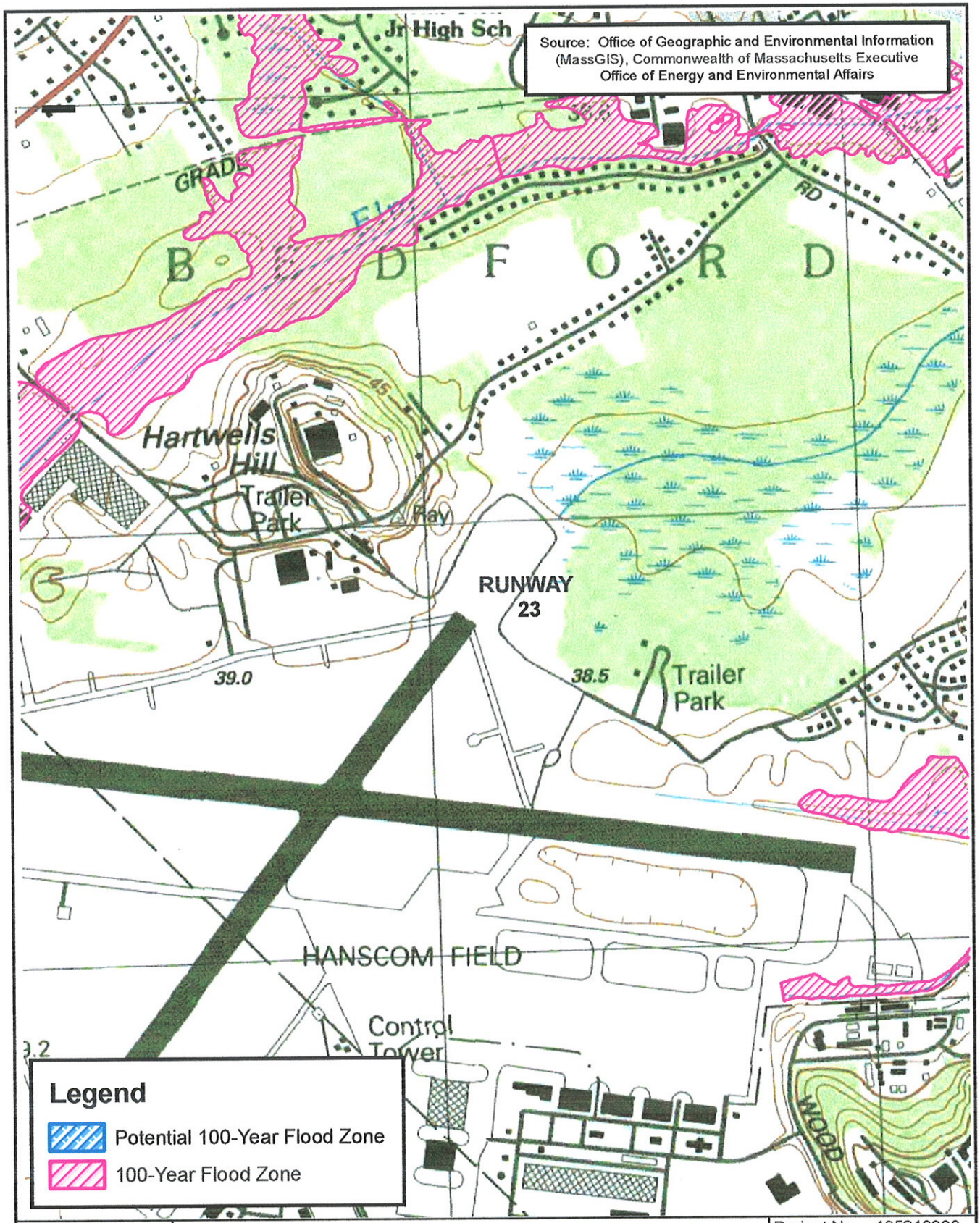


Stantec
Northampton, Massachusetts
Tel. (413) 584-4776
www.stantec.com

L.G. HANSCOM FIELD
VEGETATION MANAGEMENT PLAN
FEMA FLOOD MAP - RUNWAY 11
FIGURE 3-2

BEDFORD MASSACHUSETTS

Project No.	195210330
Proj. Mgr.	SGL
Scale	1" = 500'
Date	SEPT. 2008
A	



Stantec
Northampton, Massachusetts
Tel. (413) 584-4776
www.stantec.com

L.G. HANSCOM FIELD
VEGETATION MANAGEMENT PLAN
FEMA FLOOD MAP - RUNWAY 23
FIGURE 3-3

BEDFORD MASSACHUSETTS

Project No.	195210330
Proj. Mgr.	SGL
Scale	1" = 1000'
Date	SEPT. 2008
A	

3.4 NUISANCE VEGETATION

The emergent marsh within VMA 17 contains established stands of purple loosestrife (*Lythrum salicaria*). Purple loosestrife is an herbaceous species which is capable of rapid colonization of disturbed soils and can outcompete most native vegetation where disturbed soils and full sun coverage occur within and adjacent to emergent wetland areas. The spread of this species is primarily a concern in those wetland areas where conversion from a scrub-shrub wetland to a wet meadow area will result from the vegetation removal; no removals in VMA 17 propose this conversion.

European buckthorn (*Rhamnus frangula*), an invasive shrub species also located on the property, is the dominant shrub layer species in most wooded wetland areas in VMA 17. It is immune to removal through cutting, and is capable of rapid colonization of areas where competition is low, and light penetration is not a limiting factor. Seed dispersal by this species is completed by several common wildlife species, thus eradication of buckthorn from a site is not feasible if seed stock occurs within adjacent, unmanaged areas. The proposed control of this species within this SVMP includes the use of herbicides within the removal limits to slow the spread of the species to allow for native shrubs to colonize the managed areas. This is further explained in Section 5.0 of this SVMP.

3.5 ORGANIC SOILS

Many wetland soils include a surface horizon of highly decomposed organic material. The hydrology required to develop this characteristic typically results in a soil that will not support machinery under normal conditions. Such soils are highly susceptible to disturbance from vegetation removal activities, thus the identification of these areas on the project site is required to reduce wetland impacts. Where the areas of these soils are too wide (i.e. greater than 100 feet) to allow vehicle access to penetrating vegetation, special removal techniques must be considered.

A reconnaissance survey of VMA 17 reveals that all of the emergent wetland area between Areas 1 and 2 contain deep organic soils. Additionally, the wetland immediately east of Areas 3 and 4 also contain varying depths of organic deposits. These areas will not freeze under normal winter conditions. No machinery access is possible through these areas. While Areas 1 and 3 are accessible from adjacent uplands and stable wetland soils, Area 2 is completely isolated and Area 4 is somewhat isolated by these problematic soils.

4.0 Vegetation Management

Four distinct areas of vegetative obstructions have been identified within the Jordan Conservation Area within VMA 17. Each is shown on the enclosed plan. The following narrative provides a brief description of each area relative to target vegetation, soil condition and impediments to obstruction removal.

4.1 AREA DESCRIPTIONS

Area 1

Size: 0.3 acres
Existing Dominant Target Vegetation: White Pine (*Pinus strobus*) 60'-95' tall
Condition: Upland and Wetland

This area abuts airport property and is accessible directly from an upland peninsular that contains an existing access roadway used as a part of the on-going Air Force groundwater testing program. It is adjacent to previous upland removal areas on airport property of a similar community type (removal area Up-20 from the 2003 removal project). All target vegetation within this area is taller than 50 feet (canopy layer only).

The understory of this area is dominated by European Buckthorn (*Rhamnus frangula*) with some native shrubs mixed throughout including Highbush Blueberry (*Vaccinium corymbosum*), Speckled Alder (*Alnus rugosa*) and Arrow-wood (*Viburnum dentatum*). Groundcover is a mix of ferns, Wintergreen (*Gaultheria procumbens*) and clubmosses. The borders of the area are emergent marsh, created by on-going beaver activity within the Hartwell Brook headwaters. Standing dead timber is prevalent in the surrounding marsh, indicative of the past community-type (pine/maple forested wetland). Common Cattail (*Typha latifolia*) dominates the marsh, but some Purple Loosestrife (*Lythrum salicaria*) is mixed in.

Area 1 is mostly upland, with some wetland along the outer edges. The target pines are predominantly within the upland portion of the site, occurring within the 20:1 TERPS surface and partially within the 7:1 FAR Part 77 transition surface. Wetland resources are limited to "bordering vegetated wetland"; the area is located beyond the limits of the 100-year floodplain. The soils are quite sandy, and readily freeze under winter conditions. Access to the site is partially encumbered by an obstruction light pole system. Avoidance of the poles and connecting wires will be necessary during removal of the target trees.

Area 2

Size: 1.5 acres
Existing Dominant Target Vegetation: White Pine (*Pinus strobus*) 60'-95' tall
Condition: Upland and Wetland with some Riverfront Area

This area is an isolated upland surrounded by emergent marsh with deep organic soils. No direct upland access to the area is available for machinery access. All trees within this area that are taller than 50 feet will be removed in accordance with Helicopter Removal criteria.

Area 2 is quite similar to Area 1 in terms of vegetative composition. It is dominated by White Pine (*Pinus strobus*) in the canopy with some shorter Red Maple (*Acer rubrum*) along the wetland fringe. The shrub layer is dominated by the invasive European Buckthorn (*Rhamnus frangula*) in the upland, which mixes with various native wetland shrubs along the edge. Groundcover contains a mix of ferns and clubmoss.

The surrounding emergent marsh poses a significant obstacle to access. The marsh surrounds this upland island, and the soils do not freeze or dry out sufficiently for machine access. This condition reduces the available removal techniques.

Area 2 is mostly upland, with a vegetated wetland fringe to the south, north and east. The first recognizable channel section of Hartwell Brook occurs just northwest of Area 2, and the 200-foot riverfront area extends into a portion of the removal area. The area is not located within the limits of the 100-year floodplain. The target pines are located mostly in the upland area, with some within riverfront area. The targets occur within the 20:1 TERPS surface and partially within the 7:1 FAR Part 77 transition surface. The soils in the upland are sandy and stable. The lack of an upland connection to this area is significant relative to target removal. Removal of the debris from the site dictates the use of Helicopter Removal..

Area 3

Size: 2.1 acres
Existing Dominant Target Vegetation: Red Maple (*Acer rubrum*) and Quaking Aspen (*Populus tremula*) 40'-60' tall
Condition: Mostly Wetland

This area abuts airport property and will be accessible directly from the airport property (removal area 23-4); an existing gate in the security fence can be used. All vegetation within this area that is within 15 feet of the TERPs 20:1 offset approach surface will be removed in accordance with Cut and Chip criteria. Specific areas of removal will be minimized by utilizing ground-based survey during the removal efforts to identify individual trees for removal.

This area is mostly second growth deciduous forest and has been affected by the fluctuating water levels resulting from the beaver activity. The canopy is dominated by a mix of Red Maple (*Acer rubrum*) and Quaking Aspen (*Populus tremula*) with some birch (*Betula* spp.) and oak (*Quercus* spp.) mixed throughout. A dense shrub layer that includes Speckled Alder (*Alnus rugosa*), Highbush Blueberry (*Vaccinium corymbosum*), European Buckthorn (*Rhamnus frangula*) and tree saplings exists in patches between the dense trees. Small breaks in the dense canopy greatly influence the shrub layer. The groundcover is quite variable in terms of composition and density. Sensitive Fern (*Oncoclea sensibilis*) is quite common.

Most of Area 3 occurs in wetland, but the soils are mineral in nature since they occur at the upper end of the wetland. These soils dry or freeze sufficiently to support machinery if necessary. Area 3 is distant from the Hartwell Brook channel and is not within 100-year floodplain. The principle access issue is the lack of suitable cleared area between the Massport gate and the obstruction area. It is necessary to traverse some non-target areas to gain access to Areas 3A and 3B, however; the specified removal techniques require only foot traffic through the area. Private properties occur to the west, limiting the available routes to the obstructions.

Area 4

Size: 2.3 acres
Existing Dominant Target Vegetation: White Pine (*Pinus strobus*) and oak (*Quercus spp.*) 60'-100' tall
Condition: Mostly Wetland

This area abuts residential properties and is not directly accessible by vehicular equipment. Though contiguous with Area 3, the haul route would be quite lengthy to the Massport gate at the Runway 23 end. All vegetation within this area that is within 15 feet of the TERPs 20:1 offset approach surface will be removed or topped in accordance with a combination of the Helicopter Removal and Top and Girdle criteria. Removal will be minimized by utilizing ground-based survey during the removal efforts to identify individual target trees for removal.

This area occurs at the upper fringe of the wetland and appears to be a transitional zone between the emergent marsh and the upland pine forest to the north. In Area 4, White Pine (*Pinus strobus*) dominates, but there are interspersed deciduous trees including oak (*Quercus spp.*) and Red Maple (*Acer rubrum*). The pines appear to be the principle targets as they appear taller than the deciduous trees. This will be confirmed through ground-based survey during the actual removal operation.

The soils are variable in Area 4, but are chiefly mineral and are subject to freezing. While they would support machinery, access to/from the area from a staging area would not be feasible thus limiting the selection of removal techniques. Part of the conservation area trail network is within the limits of Area 4 which is a resource to be protected during the removal operation.

Most of Area 4 consists of bordering vegetated wetland, but is outside of riverfront area and the 100-year floodplain.

4.2 PRIMARY REMOVAL TECHNIQUES

Primary environmental constraints present at the Runway 23 end within the western obstruction areas (Areas 3 and 4) include limited access points, sensitive wetland resources, organic soils with limited freeze potential, close proximity to residential abutters and private property concerns. There is also a trail through this obstruction area, although it appears to get little use; this trail is shown on the plan. Given these constraints, the use of heavy machinery to access and selectively remove target trees in the western obstruction area would be difficult, since soil impacts are likely to occur; only the southern end of Area 3 is accessible from stable soils and is in close proximity to the Massport property boundary. Additionally, distances from potential landing areas to the furthest obstructions are significant, requiring a skidder road if typical mechanical removal were to be practiced. These methods could temporarily reduce the recreational potential of the conservation area, as incidental damage to non-targets could occur.

The eastern obstruction area (Areas 1 and 2) are somewhat less constrained. The obstructions occur mainly in upland or fringe wetland areas, and access is available from the airport obstruction lighting road to Area 1, while Area 2 is isolated by emergent wetland. The distance between the existing road and the furthest obstruction is less than 500 feet; a relatively short distance for transferring the downed trees. The soils are quite sandy within the Area 1, with limited organic accumulation. These soils will freeze sufficiently for use of ground vehicles for mechanical removal. This area of the conservation area appears to be used very little, as it is somewhat isolated from the Town Forest trail network by the beaver flooding. No trails were noted through this portion of the forest.

Given these constraints each of the removal areas is analyzed in the following section for a primary removal methodology.

4.2.1 Removal Method Selection

Due to the access and soils issues of the western obstruction area (Areas 3 and 4), four methods are viewed as viable for addressing the obstructions while limiting the impact to the conservation and recreation usage of the property. These include helicopter removal, tree topping, topping/girdling and cut-and-chip. Each method is described below. Typically, the GEIR requires an alternatives analysis where all of the GEIR methods are assessed for use in the removal areas. Due to the environmental constraints of Areas 1 through 4 in VMA 17, this analysis has only assessed removal methods that have a tier classification of "moderate, low or minimal impact" (see the November 2008 VMP Update – Chapter 4). Thus, this SVMP analysis is abbreviated due to the self-imposed limitations of available primary removal methods. Additionally, this work is not proposed to create low-growing vegetative communities. A target

specific type of management is proposed for the four removal areas in the Jordan Conservation Area. Thus those techniques which are not as selective were not considered for this SVMP.

Helicopter removal includes the felling of trees by hand with chain-saws, lopping and reducing limbs in place, and attaching the trunk sections to a cable lowered from a helicopter. The trees are then transported to an established staging area on airport property where further processing of each tree is completed. This processing may include chipping of unusable sections and reducing trunks to standard lengths for trucking. Chips and logs are then removed from the staging area by trucks. With helicopter removal, directional felling of trees within wetland areas is practiced to avoid stream channels and dense shrub areas, providing protection to wetland functions and values. Where possible, felling is directed to the most open area available, since protection and promotion of the shrub layer is an objective within the helicopter removal method.

Negative aspects of helicopter removal involve noise impacts to residential abutters, the hovering mode necessary when the cable is being attached to the helicopter results in significant noise which is quite noticeable within a ¼-mile radius of the site. This impact is reduced during the winter, when outdoor activity is minimized and house windows are closed. Additionally, helicopter removal requires the felling of each of the target trees, resulting in some crushing of underlying vegetation. Through directional felling, this impact can be minimized, but not eliminated. This is also the most expensive of the removal methods, with costs up to $12,000 per acre depending on the size of the project.

Tree topping and pruning involves identifying the target trees in the field, determining the extent of the penetration, climbing each tree, and removing the penetrating portion (plus approximately 10-15 feet to account for approximating errors and to provide some longevity). The tops are felled to the ground, where they are further reduced with chainsaws to 1-3' sections. If necessary, the cut debris is scattered by hand to reduce the bio-loading impact on the underlying vegetation. For a portion of the obstructions, this method allows the living tree to remain in place, with a modified canopy. It continues to produce leaves and shade, and will continue to grow. Tree topping is constrained by a number of factors, which will determine the extent to which it can be used on this project. Typically, topping is restricted to deciduous trees, since the common coniferous species (such as white pine and hemlock) will die within a couple of years when topped. Also, in a forested situation, the canopy of deciduous trees can be restricted to the upper 25% of the tree. Where the tree penetrates the protected airspace surface by more than 25% of its length, the entire canopy is removed in the topping, which will usually kill the tree. Also, topped trees will typically expend most of their growth energy during the next growing season to the cut portion, resulting in a re-obstruction within 3-5 growing seasons. This necessitates a new project on a rotational basis for the same trees.

Similar to the tree topping method is the top-and-girdle method, which involves identifying the target trees in the field, determining the extent of the penetration, climbing each tree, and

removing the penetrating portion of the tree with chainsaws. The tops are felled to the ground, where they are further reduced with chainsaws to 1-3' sections. If necessary, the cut debris is scattered by hand to reduce the bio-loading impact on the underlying vegetation. The final step is to girdle the tree; an action involving use of a chainsaw to cut 1-3 rings through the bark and into the cambium layer. This action slows, and eventually stops the transfer of fluids up/down the tree, resulting in the loss of the tree over a 2-5 year period. The resultant tree trunk provides excellent habitat, especially in close proximity to a wetland area.

Negative aspects of the top-and-girdle technique include the remaining biomass from the tree tops, and the resultant standing dead timber due to the eventual death of the tree. Standing dead timber is common in the conservation area due to past beaver flooding; however it should remain a concern, especially where obstructions occur near or over existing paths in the conservation area. While it provides good wildlife habitat, it will fall as decay reduces the strength of the wood.

The cut-and-chip removal method is specified where tall shrubs, tree saplings, and small trees are the obstructing vegetation, and preservation of a low shrub layer is an objective. This method will include hand cutting of target woody vegetation in the most sensitive areas. Additionally, this method is specified where soil conditions prohibit equipment access to all or part of the VMA, requiring the hand carrying or cabling of trees to a staging location for processing and removal from the project site. No wood chips will be deposited on the surface of the ground. Vegetation subject to cut and chip removal is highly selective, and results in the protection of the shrub and groundcover layers. Cut areas will be subject to herbicide application to control re-growth from stumps.

All downed timber, logs, snags, debris, and rubbish of any nature shall be removed as part of the initial vegetation removal. No equipment will be allowed within wetland buffers unless the Contractor can demonstrate that no soil disturbance will occur. Work within wetlands and wetland buffers will not be performed until Massport has secured all necessary permits.

All rutting created by removal efforts will be regraded. Any rutting and soil disturbance that may occur on slopes shall be regraded and stabilized immediately by seeding and mulching as per the mitigation measures contained in Chapter 5 of the VMP Update. Erosion control barriers are used in these areas on an as-needed basis only. Where optimal working conditions occur, soil disturbance can be completely avoided.

TABLE 4-1: SUMMARY OF PRIMARY REMOVAL METHODS FOR VMA 17

Removal Method	Advantages	Disadvantages	Mitigation Needs
Helicopter Removal	Easy access to obstructions Limited potential for soil disturbance Limited incidental damage to non-target vegetation Substantial retention of existing community type	Noise Tree tops remain at the site Expense	- Reduce tree tops on the ground - Advance notification of residential abutters - Stabilization of landing area
Tree Topping and Pruning	Easy access to obstructions Limited potential for soil disturbance Limited incidental damage to non-target vegetation Limited biomass generated Tree remains alive Substantial retention of existing community type	Limited use due to species and airspace elevations Biomass remains at drop site Expense Repeat projects required	- Reduce tree tops on the ground
Top-and-Girdle	Easy access to obstructions Limited potential for soil disturbance Limited incidental damage to non-target vegetation Limited biomass generated Creates wildlife habitat	Results in standing dead timber Biomass remains at the drop site Expense	- Reduce tree tops on the ground - Evaluate trees near trails for further cutting
Mechanized Felling	Rapid target removal All debris removed from site Expense	Access road needed Incidental damage to non-target vegetation Potential for spread of invasive species	- Stabilization of landing area - Control invasives after target removal - Stabilize access road - Use a forwarder in place of a skidder to reduce vehicle trips
Cut-and-Chip	Limited potential for soil disturbance Limited incidental damage to non-target vegetation" Limited biomass generated	Limited use due to species and airspace elevations Short access to staging area required Repeat projects required Labor intensive	- Clear ID of targets - Rut repair from dragging - Staging area repair

Since Area 1 has good access and limited constraints due to soils, machinery can be used to remove the obstructions and to remove all logs/debris from the property. Machinery alternatives involve the use of cutting machinery and transfer vehicles. The method for Area 1 should include the use of a feller/buncher, which can grab the target tree, cut the base, and then place the tree in a group on the ground so a skidder or forwarder can remove several of the trees at a time to a landing area. A forwarder may be preferable since it can transfer more trees in each trip, thus limiting the impact to the temporary access roadway. All trunk and canopy material is removed from the site. If completed in the winter, there is typically little damage to surrounding vegetation except within the footprint of the skid road. Complete vegetative cover within the cut area would occur within two growing seasons (as occurred within the adjacent area on the airport after the 2003 cutting).

The negative aspects of the mechanical removal include the incidental damage to non-target vegetation within the skid road, and the potential for the spread of invasive species in the cut area (European buckthorn). The limited light penetration restricts the density of the existing buckthorn coverage, however it can quickly expand when the canopy is removed. Targets in Area 1 are restricted to the taller pines. Once removed, the area can be allowed to re-grow naturally with little post-removal management. Pines could grow to obstruction height within 20-30 years following this initial removal. The post-removal community will be an early successional forest of mixed deciduous and coniferous species.

Area 2 contains the same vegetative community, but access is not possible via the ground. The removal area is isolated by emergent wetland with organic soils that will not freeze. The target species are mature pines that are too large to top (they will die, and then drop significant debris for a period of years). Also, they would generate significant ground biomass that would impede the growth of ground vegetation. The only viable option for this area involves helicopter removal.

The staging area to be used for the helicopter removal operation would be the same as was used in the recent management of removal areas 23-1 and 23-2. The staging site occurs immediately west of the water treatment plant which can be seen on the SVMP plan. All chip and log processing would occur in that staging area.

Area 2, like Area 1, could be allowed to re-grow with little post-removal management. The pines are the targets, and all lower vegetation can be allowed to remain. It is anticipated that existing saplings could obstruct the airspace within 20-30 years following this initial removal. The post-removal community will be an early successional forest of mixed deciduous and coniferous species.

Area 3A at the southern end of the western removal area occurs immediately adjacent to the Massport perimeter fence. A gate exists that provides stable access to/from Area 3A. Here, the protected airspace is lowest in elevation, and the vegetation is the smallest of any of the four removal areas. Additionally, Area 3A is dominated by deciduous species which will continue to grow requiring continuous removal and maintenance. The target trees are relatively small and are numerous. Mineral soils predominate over this removal area.

Due to the numerous smaller targets and relatively low elevation of the protected airspace, and the accessibility to an upland staging area on Massport property, the cut-and-chip technique appears suitable to Area 3A. Targets will be identified, marked, and then hand cut for removal to the staging area. There, the cut trees will be processes and removed from the site. The dragging of the cut vegetation causes some minimal incidental damage, and some repair through seeding will likely be necessary. The increased light penetration may require some invasive species control after the primary removal. Rapid re-growth from the stumps is anticipated since most of the targets are deciduous and are known to be quick growing species. Some secondary control is recommended in order to reduce the frequency of primary removal projects in the future. The post-removal community will consist of an early successional deciduous forest dominated by a low sapling layer. Frequent removal on a 5-10 year rotational basis will be necessary as the saplings that are allowed to remain grow to obstruction height.

In reviewing available removal alternatives, it would appear that the combination of helicopter removal, tree topping and top-and-girdle techniques would be best for Areas 3B and 4. Here, the trees are much larger, but fewer than in Area 3A. All coniferous targets (most of Area 4) would be removed via helicopter removal to the treatment plant staging area. Remaining trees would then be surveyed, and those deciduous trees within 15 feet of the airspace surface would then be topped. Girdling can be practiced where some wildlife habitat creation is warranted, and/or where thinning of the deciduous stand would result in better overall form of the community as a whole. Concern about standing dead timber over the conservation area (particularly over the trail) would require elimination of the top-and-girdle, and replace with helicopter removal. Thus, entire trees would be removed, and a stand of trees (deciduous only) that could be topped and allowed to live. This would preserve the canopy of the conservation area, while addressing the obstruction issue.

Areas 3B and 4 would experience an initial conversion to early successional forest, but field reconnaissance suggests that much of the canopy layer will remain thus no substantial modification of the vegetative community is expected to occur. Since pines are the predominant target in Areas 3B and 4, an eventual conversion to a deciduous forest would result from continuous management. By thinning the deciduous trees through girdling and/or helicopter removal, the growth form of the individual trees can be influenced to more of a spreading form. In this manner, penetrations by trees in these removal areas can be reduced so that the frequency of primary removals is decreased to 10-20 year cycles.

Each removal method would be preceded by an extensive field effort to mark the individual obstructions in the field, and to plan for the removal process. Obstructions would be marked with typical tree marking paint, and areas in question would be surveyed from the runway end to confirm the obstruction. Once all marking has been completed, the removal timing would then depend on weather conditions. This should occur under dry or frozen ground conditions. The exact process would need to be thoroughly identified in the permit process. A Notice of Intent would be required before the work could proceed.

4.3 SECONDARY REMOVAL (MAINTENANCE) TECHNIQUES

In the eastern area, the complete removal of the obstructing white pines would allow for the rapid re-growth of the understory of white pine saplings that currently exist there. The long term management of this area should be the continuous removal of mature white pine with the protection of the sapling layer. Some herbicide control of the invasive buckthorn should be practiced in this area to promote re-growth of a native vegetative community. Buckthorn control is also suggested in Areas 3B and 4 initially, to restrict the rapid colonization of the managed areas during the first few years of increased light penetration. Area 3A will require some cut stump treatment, and invasives control can also be practiced.

The herbicide application of invasives and the cut stump treatment in Area 3A would be proposed during years 2 through 5 of the SVMP operational plan. The application would occur per Chapter 4, Section E1 of the November 2008 VMP Update.

4.4 YEARLY OPERATIONAL PLAN

Development of Yearly Operational Plans (YOPs) provides strategies for annual scheduling and budgeting of vegetation management activities. The costs associated with the vegetation removal normally require the separation of the removal work into two or more years. Additionally, many maintenance tools require specific time periods and/or weather conditions to be utilized. YOPs are typically specified over a five year period.

The proposed vegetation management plan for Areas 1 through 4 involves an initial mechanical and hand removal of obstructions followed by re-growth and nuisance vegetation control through herbicide treatment. It is proposed to complete all of the necessary penetration removal in the first year (during dry or frozen ground conditions sufficient to eliminate wetland impacts due to the removal of the logs and slash), followed by foliar treatments as shown in ***Table 4-2***. Maintenance of all management areas will be performed during the second year of the plan, and then on an annual basis through Year 5.

TABLE 4-2: YEARLY OPERATIONAL PLAN FOR VMA 17

Year	Actions
1 (2009/2010)	Permitting of the SVMP. Removal of all identified penetrating vegetation from Areas 1 through 4 according to the removal methods proposed in this SVMP. Wetland work is restricted to periods of dry or frozen ground conditions. Complete baseline monitoring of the vegetation plots.
2 (2010)	Initial Foliar Treatment within Areas 1 through 4, typically completed in mid-to-late summer. Complete vegetation and invasive species monitoring reports.
3 (2011)	Second foliar treatment. Complete vegetation and invasive species monitoring reports.
4 (2012)	Third foliar treatment of all applicable VMAs. Complete vegetation and invasive species monitoring reports. Conduct shrub plantings.
5 (2013)	Maintenance of all VMAs including fourth foliar treatment. Invasive species control in applicable VMAs. Complete final vegetation and invasive species monitoring reports.

5.0 Mitigation Measures

Certain measures are proposed with the initial obstruction removal and the follow-up maintenance that will protect the functions and values of the Jordan Conservation Area during the management of Areas 1 through 4.

5.1 SENSITIVE REMOVAL TECHNIQUES

Of principal importance to the overall protection on non-target vegetation and sensitive soils is the selection of removal techniques in the lower impact tiers of the GEIR removal method menu. For this project, helicopter removal and topping are the dominant primary removal methods proposed for the obstruction areas. A small area of cut-and-chip (a low impact option) and mechanized felling (a moderate impact option) are also proposed. These techniques maximize protection of the non-targets, protect soils, and substantially retain the characteristics of the existing vegetative community.

In addition, Areas 3B and 4 will be managed to promote a deciduous canopy of a spreading form that will reduce the need for future removals. Only pine and the tallest of the deciduous trees are obstructing the 20:1 TERPS surface. By removing pine and then thinning the remaining deciduous trees, a spreading deciduous forest can be created that minimizes the "pole" trees that place most growth energy into height. The increased light penetration, when combined with invasives control, will generate a dense shrub and sapling layer. This method will preserve the forested nature of Areas 3B and 4.

5.2 INVASIVE SHRUB SPECIES CONTROL

Four foliar herbicide applications are proposed in Years 2 through 5 of the removal areas (6.2 acres) to impede the growth of European Buckthorn (*Rhamnus frangula*), thus allowing for native shrubs to spread in response to the increased light penetration. The applications will occur in late-summer or early-fall. Notice will be provided at town hall and in a local newspaper at least five days prior to treatment. Additionally, signs will be posted at the trail entrance notifying park users of the treatment. The trail should be closed for a week following the application.

5.3 SHRUB PLANTINGS

Massport has evaluated the removal areas and the techniques proposed for removal of the obstructions. It is quite apparent that Areas 2, 3 and 4 will maintain a significant canopy coverage upon completion of the work. The recently managed areas 23-1 and 23-2 prove that, in certain areas, it is possible to manage the obstructions while maintaining a canopy layer. Based on this field reconnaissance and past experience, it is proposed that native shrubs be used to improve the vegetative condition of the managed areas. The combination of the invasives control, the introduction and care of native shrubs, and the protection of non-target

canopy species will preserve and enhance the overall vegetative communities in the removal areas.

Massport proposes the installation and maintenance of 500 native shrubs (1 gallon size containers), the species and spacing of which will be determined after the removal of the obstructions. The techniques selected for the initial removal will protect much of the canopy layer throughout Areas 3 and 4. Additionally, Area 2 will retain much of the sapling layer as well. Only Area 1, the smallest removal area at 0.3 acres, will experience a complete loss of the canopy layer since it is close in to the runway end and dominated by even height pines. Here, preservation of deciduous saplings should provide for the natural re-establishment of the sapling and low canopy within five years (as occurred in the adjacent removal areas on Massport property). Shrubs should be planted in Year 4 of the plan, once sufficient buckthorn control has been achieved.

The shrub plantings will require initial watering and deer protection. Protective fencing is not an option as it would deter the use of sections of the conservation area. Wire mesh cages combined with trunk wrapping (of the more linear shrub species) could be used in combination with deer repellent to reduce the loss of the nursery stock due to predation. Details of the plantings can be coordinated during the permitting of this SVMP.

Appendix 1

FAA Correspondence

Meeting Notes

Airspace Analysis Progress Meeting

2007 L.G. Hanscom Field Airport Airspace Analysis

Stantec

Date:	January 23, 2008
Place/Time:	FAA New England Region Office - Burlington, MA / 1:00 PM
Next Meeting:	
Attendees:	See attached meeting attendance record.
Absentees:	
Distribution:	all attendees

Item:

Introduction, Project Goals and Methodology

Mr. Langlais opened the meeting with introductions and then giving a brief overview of the project goals and the methodology utilized to create the plans. He explained that Stantec, under contract with Massport, had performed an extensive airspace obstruction analysis of the Hanscom Field utilizing data obtained through aerial tree top photogrammetry. The most recent prior obstruction analysis at the airport was performed based on data from the fall of 2004. The current analysis included evaluation of penetrations to obstacle clearance surfaces associated with FAR Part 77, TERPS, PAPI, Approach Lights Plane, Threshold Siting, Missed Approach, and Departure. It was determined during the scoping process that One Engine Inoperative surfaces were not required to be analyzed. The purpose of the meeting was to go over in detail the results of each analysis, by runway end, discuss the practical implications of the penetrations to airport operations/operational capability, and to obtain guidance/direction from the FAA as to which surfaces must be maintained free of penetrations and if necessary what further steps must be taken by Massport to obtain a determination from the FAA on the matter.

Review of Surfaces Analyzed

Mr. Langlais proceeded to review the developed obstruction plans with the attendees addressing each surface in turn. A brief summary of the discussion for each surface is as follows:

Runway 5-23 - Part 77

The Runway 5 Part 77 20:1 (visual) approach area is in fairly good shape, with only a few trees identified that are within 5 feet of penetrating the surface. There are a few acres of upland trees that penetrate the 7:1 transitional surface on the left (northwest) side of the approach, almost entirely on airport property. Previous recent vegetation management has not addressed the transitional surface areas, and it was agreed that this area should be included in future vegetation management.

The Runway 23 Part 77 34:1 (non-precision) approach area has many acres of penetrations, primarily in an area known as the Hartwell Town Forest. Mr. Langlais discussed the Notice of Determination issued by the FAA on February 6, 2006 (copy

attached herein) which concurred with Massport's recommendation that the Runway 23 approach be maintained to the TERPs 20:1 offset approach surface and that the Part 77 obstructions, in part because of their distance from the threshold, are not a hazard to air navigation. It was agreed that the on-airport penetrations to the 34:1 surface must be removed and maintained and these will mostly be removed during the upcoming Runway 23 safety area improvements project.

Runway 11 TERPS Obstacle Clearance (W-X-Y) Surface

The TERPS Obstacle Clearance (W-X-Y) Surface for Runway 11 was presented and has relatively small areas of penetrations. Previous vegetation management in this approach has removed the majority of the penetrations to these surfaces. The central (W & X) areas are limited to slight obstructions that have penetrated since the most recent removal efforts. There is a short section of security fence on the north side of Pine Hill that penetrates the surface and will need to be relocated. The outer (Y) area includes a few acres of trees south of Pine Hill that have not been included in recent vegetation management efforts. Mr. Yardley noted that if Massport intends to lower the minimums for the runway to 250 feet, that they would need to remove all the penetrations to the OCS. A small area of penetrations west of Pine Hill is off airport property.

Runway 11 Glidepath Qualification Surface

There are currently no penetrations to this surface.

Runway 11 "Special" Control Surface West of Pine Hill

Previous obstruction analyses and associated vegetation management efforts at Hanscom have included a special control surface due west of Pine Hill. This is a level surface at elevation 210 MSL. The intention of identifying and removing vegetation that penetrates this surface is to keep the area lower than the top of Pine Hill. Only one tree has been identified to currently penetrate the surface and a few others are within 5 feet below the surface. Most of this area is off airport property. Mr. Yardley stated that since the FAA is now mostly concerned with the W-X-Y surface at this runway end, the special surface isn't a concern with regard to TERPs. Mr. Vacirca said that if Massport wants to remove this surface as a requirement, that Massport would need to make this request as part of the final obstruction analysis report.

Runway 11 Approach Light Plane

There are a small number of penetrations to this surface, mostly around the perimeter. This surface does not directly affect the approach minimums but should be maintained clear, and it will continue to be included with all future vegetation management at the airport.

Runway 29 TERPS Obstacle Clearance (W-X-Y) Surface

The TERPS Obstacle Clearance (W-X-Y) Surface for Runway 29 was presented and has relatively small number of penetrations, most of which were not identified in the most previous analysis. This entire surface can be cleared by removing approximately

two acres between the end of the paved overrun and the Shawsheen River, and about a dozen larger trees within the business park. Mr. Yardley stated that achieving a clear OCS to this runway as part the next round of vegetation management will allow Massport to avoid having the runway's TERPs minimum Height Above Threshold (HAT) increased from 200 feet to 250 feet. Mr Ennis ensured him that the obstructions would be removed.

Runway 29 Glidepath Qualification Surface

There are currently no penetrations to this surface.

Runway 11 Approach Light Plane

There are a small number of penetrations to this surface, which were not penetrations at the time of the 2004 obstruction analysis. This surface will be cleared during the next round of vegetation removal and will continue to be included with all future vegetation management at the airport. Not removing the approach light plane penetrations would cause the FAA to increase the runway's minimums from ½ mile to ¾ mile.

Runway 5 TERPs 20:1 Visual Area Approach Surface

Similar to the Part 77 20:1 approach to this runway, there are a small number of trees just below the surface, and they will be removed during the next round of vegetation management at the airport.

Runway 23 TERPs 20:1 Offset Visual Area Approach Surface

This is the approach for which the FAA Notice of Determination dated February 6, 2006 noted that Massport needs to clear (or mitigate) obstructions. Massport intends to negotiate as soon as practical with the Town of Bedford in order to get approval to remove the approximately 5 acres of obstructions from this approach, which are in an area known as the Jordan Conservation Area, which is owned by the town. Because this alternative avoids the need to clear trees from the Harwell Town Forest, it is anticipated that the Town will be amenable to this option, and it will be included in the Vegetation Management Plan update to be developed and hopefully permitted this year.

There is a small area of obstructions (less than 2 acres) that are just outside of the existing Part 77 transitional surface obstruction lights on the left (southeast) side of the approach, and Massport will include this area in the permitting and subsequent removal in order that these obstruction lights can then be removed.

Runway 11 and 29 Part 77 50:1 Approach Surfaces and Primary Surface

Historically, Massport has not maintained vegetation to the 50:1 approach surfaces to this runway because it has always been determined not to be feasible. The obstructions to this surface were presented in the analysis for informational purposes only. Previous recent vegetation management efforts at the airport have not addressed

penetrations to the primary surface. Mr. Langlais showed a small number of trees just north of the Runway 11 threshold, which have been identified to penetrate the primary surface and which will be removed in the next round of vegetation management at the airport.

Runway 11 and 29 40:1 Departure Surfaces

Mr. Langlais showed that there are significant penetrations to these surfaces. Mr. Yardley explained that this is acceptable because the currently published climb gradients for each runway end address this and provide pilots with the necessary information to climb after takeoff and remain safely above these surfaces. It was noted that departure surfaces should be analyzed for Runway 5-23 as well.

Runway 11 Missed Approach Surface

Mr. Langlais presented the missed approach analysis for Runway 11, and the central portion showed only a small number of obstructions. The right side 7:1 surface showed obstructions along the south side of Pine Hill, which are similar to those identified for the Runway 11 Obstacle Clearance Surface. Mr. Yardley noted that it is critical that these obstructions be removed as soon as practical. He questioned whether the analysis was performed for a 200-foot or a 250-foot Height Above Threshold (HAT). Mr. Langlais will confirm that the analysis was properly run based on the currently published 250-foot HAT. If that is the case, then the it is indeed critical that these trees are included in the next round of vegetation management at the airport.

Runway 29 Missed Approach Surface

This analysis showed only one slight penetration, which will be permitted and removed during the next round of vegetation management at the airport. Mr. Langlais will confirm what HAT was utilized for this analysis.

The obstruction analysis report will now be finalized and redistributed. It is anticipated that all penetrations identified can be removed for the surfaces that need to be maintained clear.

The meeting adjourned at approximately 3:00 PM.

The foregoing is considered to be a true and accurate record of all items discussed. If any discrepancies or inconsistencies are noted, please contact the writer immediately.

STANTEC CONSULTING SERVICES INC.

Steven G. Langlais, PE
Senior Project Manager, Transportation
steve.langlais@stantec.com

Attachments: meeting agenda, meeting attendance record, FAA Notice of Determination, dated February 6, 2006
cc: Michelle Ricci

Agenda

Stantec

Worcester Regional Airport and L.G. Hanscom Field Airspace Analysis Review Meeting

Burlington, MA – FAA New England Airports Division Office
Wednesday, January 23 9:00 am – 3:30 pm

Note: Meeting will be broken into two sessions. Worcester in the morning and Hanscom in the afternoon. Items to be discussed at each session will be very similar as described below:

9:00 – 11:30 am Worcester Regional Airport Airspace Analysis

12:30 pm – 3:30 pm Hanscom Field Airspace Analysis

1. Introductions and general discussion of project goals and methodology.

2. Detailed review of surfaces analyzed including a review of the obstruction analysis plans for each surface analyzed.

3. Discussion on the implications of the analysis results for each surface. Specifically, what is the potential effect of identified obstructions on current minima, effects on airport operations; what is the meaning or practical impacts to the airport, if any, resulting from obstructions to the 62.5/1 One Engine Inoperative Surface, etc.

4. Discussion of Missed Approach Analyses and implications on approach minima.

5. Open discussion on the FAA's position as to the enforcement of Part 77 vs. TERPS surfaces. Specifically, Massport is looking for clear guidance on what the next step is in obtaining FAA's determination as to which surfaces have to be maintained free of obstructions. For example: "If obstructions to FAR Part 77 surfaces are extensive and would result in extensive costs/impacts, is clearing the TERPS precision approach obstacle clearance surface (W-X-Y) an acceptable alternative?"

6. Discussion on previous "modifications to standards" or determinations that may be in place and whether or not they are still valid. For example: "At Hanscom's Runway 11 approach, a special surface has been identified previously for Pine Hill. Has this surface been superceded by the TERPS Precision Obstacle Clearance Surface (W-X-Y Surface)?"

7. Discussion of Massport's goal to try to identify a "composite surface" for each runway approach that would incorporate all required surfaces into a single one.

MEETING ATTENDANCE RECORD

Stantec

Hanscom Airspace Analysis Review

Date: January 23, 2008 **Time:** 1:00 p.m.

Location: FAA Airports, Conference Room

PARTICIPANT DATA

	NAME	REPRESENTING	TELEPHONE	EMAIL
1	Steve Langlais	Stantec Consulting	207 775-3211	steve.langlais@stantec.com
2	LANCE KING	STANTEC	207 775 3211	lrking@stantec.com
3	Jim McLaughlin	STANTEC	207-775-3211	Jim.mclaughlin@stantec.com
4	Cliff Vaccaro	FAA	781-238-7637	cliff.vaccaro@faa.gov
5	TOM ENNIS	MASSPORT	617.568.3546	tennis@massport.com
6	Heath Marsden	Jacobs Edwards & Kelcey	603-666-7181	Heath.Marsden@jacobs.com
7	Bill Hodgdon	"	617-680-5750	Bill.Hodgdon@jacobs.com
8	PETER AUSTIN	MPA	617-568-3919	paustin@massport.com
9	George Yardley	FAA Eastern Reg.	404 305 5137	george.m.yardley@faa.gov
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

U.S. Department
of Transportation

**Federal Aviation
Administration**

New England Region

12 New England Executive Park
Burlington, Massachusetts 01803

Revised: February 6, 2006
Issue Date: December 12, 2005

Mr. Rick Meade, Program Manager
Capital Programs Department
Massachusetts Port Authority
One Harborside Drive, Suite 200S
East Boston, MA 02128-2909

Aeronautical Study Number
2005-ANE-100-NRA

**********Notice of Determination**********

The Federal Aviation Administration (FAA) has concluded an aeronautical study concerning approach and departure surfaces for Runway 23 at the Laurence G. Hanscom Field in Bedford, Massachusetts (Hanscom).

We concur with your proposed actions to remove/mitigate obstructions to the runway 20:1 surfaces at Hansom as noted in your request for an Aeronautical Study, dated November 3, 2005 with the following stipulations regarding actions that need to be taken immediately:

Runway 23 – Clear on and off airport obstructions to 20:1. Provide certification that the straight-in offset and standard VAAR 20:1 surfaces are clear of obstructions. Provide certification the obstacle clearance surface associated with the VASI 3.25 degree system is clear of obstructions. Provide certification that the location of the runway threshold meets threshold siting requirements as defined in Advisory Circular 150/5300-13, Change 8.

The Massachusetts Port Authority shall provide justification to the FAA why it is not feasible at this time to clear or light obstructions in the Part 77 34:1 approach surface to Runway 23. The justification shall include any options to potentially clear or light the Part 77 34:1 approach in the future.

The determination has been with respect to the safe and efficient use of airspace by aircraft and with respect to the safety of persons and property on the ground. In making this determination, the FAA has considered matters such as effects on existing airspace structure and projected programs of the FAA; the effects that existing or proposed man-made objects (on file with FAA) and known natural objects within the affected area would have on the proposal.

This determination in no way preempts or waives any ordinances, laws or regulations of any other governmental body or agency. This determination in not meant to imply the clearing or runway threshold relocation has been found to be environmentally acceptable in accordance with existing national environmental policies and objectives.

If you have any questions concerning this determination, please contact our office.

Sincerely,

Michelle Ricci
Environmental Planner

Cc: George Yardley, BOS-FPO

Appendix 2

Obstruction Data

L.G HANSCOM FIELD COMPOSITE SURFACE ANALYSIS TO RUNWAY 23

REMOVAL AREA	TAG ID	NORTHING	EASTING	DESCRIPTION	OBS. HEIGHT	PENETRATION	CRITICAL SURFACE
Removal Area 1							
1	296	2998638.62	715074.06	Vegetation	67	11	20:1 (off airport)
1	299	2998652.25	715108.13	Vegetation	73	17	20:1 (off airport)
1	302	2998653.29	715139.56	Vegetation	80	21	20:1 (off airport)
1	306	2998687.37	715185.86	Vegetation	68	8	20:1 (off airport)
1	309	2998664.64	715263.40	Vegetation	68	-2	34:1 (on airport)
1	593	2998601.53	715123.45	Vegetation	91	35	7:1 transitional
1	596	2998608.31	715151.83	Vegetation	93	32	7:1 transitional
1	603	2998639.96	715185.38	Vegetation	90	28	7:1 transitional
1	614	2998668.24	715228.05	Vegetation	78	13	7:1 transitional
Removal Area 2							
2	323	2998831.88	715309.59	Vegetation	73	3	20:1 (off airport)
2	327	2998842.97	715350.30	Vegetation	73	0	20:1 (off airport)
2	329	2998893.43	715301.37	Vegetation	67	-6	20:1 (off airport)
2	330	2998922.82	715293.97	Vegetation	59	-14	20:1 (off airport)
2	331	2998894.09	715334.03	Vegetation	89	15	20:1 (off airport)
2	333	2998939.85	715317.58	Vegetation	78	4	20:1 (off airport)
2	335	2998931.11	715351.10	Vegetation	85	9	20:1 (off airport)
2	336	2998927.31	715386.71	Vegetation	87	10	20:1 (off airport)
2	337	2998967.69	715337.11	Vegetation	67	-10	20:1 (off airport)
2	338	2998925.06	715426.74	Vegetation	92	12	20:1 (off airport)
2	340	2998986.05	715386.55	Vegetation	81	2	20:1 (off airport)
2	341	2999006.15	715366.06	Vegetation	72	-7	20:1 (off airport)
2	343	2998975.34	715430.80	Vegetation	84	3	20:1 (off airport)
2	344	2999028.19	715410.33	Vegetation	74	-9	20:1 (off airport)
2	345	2999013.33	715464.69	Vegetation	83	-1	20:1 (off airport)
2	347	2999053.09	715438.64	Vegetation	75	-9	20:1 (off airport)
2	348	2999001.12	715511.47	Vegetation	86	1	20:1 (off airport)
2	349	2999051.83	715474.12	Vegetation	82	-4	20:1 (off airport)
2	350	2999025.91	715510.99	Vegetation	82	-4	20:1 (off airport)
2	353	2999061.59	715507.12	Vegetation	75	-12	20:1 (off airport)
2	354	2999035.54	715543.08	Vegetation	84	-4	20:1 (off airport)
Removal Area 3A							
3A	289	2999024.95	714510.88	Vegetation	42	-8	20:1 (off airport)
3A	292	2998992.78	714569.31	Vegetation	48	-4	20:1 (off airport)
3A	293	2998971.34	714611.58	Vegetation	50	-4	20:1 (off airport)
3A	294	2999011.51	714575.26	Vegetation	52	-2	20:1 (off airport)
3A	295	2999058.31	714516.86	Vegetation	44	-7	20:1 (off airport)
3A	297	2999056.92	714549.80	Vegetation	43	-10	20:1 (off airport)
3A	298	2998998.56	714630.04	Vegetation	52	-4	20:1 (off airport)
3A	300	2999100.29	714523.01	Vegetation	40	-12	20:1 (off airport)
3A	301	2999058.17	714581.68	Vegetation	52	-4	20:1 (off airport)
3A	303	2999140.04	714538.07	Vegetation	46	-10	20:1 (off airport)
3A	304	2999110.76	714602.13	Vegetation	49	-10	20:1 (off airport)
3A	307	2999169.23	714547.43	Vegetation	51	-6	20:1 (off airport)
3A	308	2999183.86	714570.45	Vegetation	49	-10	20:1 (off airport)
3A	310	2999202.24	714554.15	Vegetation	47	-12	34:1 (on airport)

L.G HANSCOM FIELD COMPOSITE SURFACE ANALYSIS TO RUNWAY 23

REMOVAL AREA	TAG ID	NORTHING	EASTING	DESCRIPTION	OBS. HEIGHT	PENETRATION	CRITICAL SURFACE
Removal Area 3B							
3B	311	2999293.69	714464.83	Vegetation	43	-13	20:1 (off airport)
3B	312	2999272.51	714522.17	Vegetation	46	-14	20:1 (off airport)
3B	313	2999291.61	714499.50	Vegetation	50	-10	20:1 (off airport)
3B	314	2999396.03	714376.99	Vegetation	59	-1	20:1 (off airport)
3B	315	2999425.28	714353.82	Vegetation	57	-2	20:1 (off airport)
3B	316	2999452.16	714343.52	Vegetation	58	-2	20:1 (off airport)
3B	317	2999407.89	714403.42	Vegetation	59	-2	20:1 (off airport)
3B	318	2999428.20	714395.91	Vegetation	59	-3	20:1 (off airport)
3B	319	2999388.97	714452.08	Vegetation	47	-14	20:1 (off airport)
3B	320	2999477.82	714380.55	Vegetation	65	0	20:1 (off airport)
3B	321	2999460.02	714407.45	Vegetation	70	6	20:1 (off airport)
3B	322	2999402.12	714507.36	Vegetation	57	-8	20:1 (off airport)
3B	324	2999534.49	714377.20	Vegetation	59	-9	20:1 (off airport)
3B	325	2999427.84	714529.98	Vegetation	59	-10	20:1 (off airport)
3B	326	2999505.39	714429.38	Vegetation	53	-13	20:1 (off airport)
3B	328	2999454.97	714544.50	Vegetation	57	-13	20:1 (off airport)
Removal Area 4							
4	332	2999584.27	714435.32	Vegetation	64	-7	20:1 (off airport)
4	334	2999583.11	714482.29	Vegetation	69	-5	20:1 (off airport)
4	339	2999651.24	714470.47	Vegetation	82	7	20:1 (off airport)
4	342	2999678.39	714494.97	Vegetation	88	12	20:1 (off airport)
4	346	2999737.88	714529.78	Vegetation	101	19	20:1 (off airport)
4	351	2999776.32	714517.39	Vegetation	91	12	20:1 (off airport)
4	352	2999736.50	714579.22	Vegetation	94	11	20:1 (off airport)
4	356	2999639.99	714770.98	Vegetation	72	-13	20:1 (off airport)
4	357	2999622.29	714806.81	Vegetation	75	-10	20:1 (off airport)
4	358	2999690.01	714727.11	Vegetation	73	-12	20:1 (off airport)
4	359	2999827.50	714560.80	Vegetation	84	2	20:1 (off airport)
4	360	2999745.67	714675.47	Vegetation	77	-9	20:1 (off airport)
4	361	2999808.67	714618.27	Vegetation	81	-5	20:1 (off airport)
4	362	2999735.41	714741.03	Vegetation	73	-14	20:1 (off airport)
4	364	2999840.45	714636.09	Vegetation	73	-15	20:1 (off airport)
4	365	2999777.58	714730.43	Vegetation	75	-13	20:1 (off airport)
4	366	2999827.19	714667.22	Vegetation	84	-4	20:1 (off airport)
4	367	2999801.48	714713.81	Vegetation	82	-8	20:1 (off airport)
4	368	2999860.02	714695.80	Vegetation	83	-8	20:1 (off airport)
4	369	2999801.61	714788.82	Vegetation	76	-14	20:1 (off airport)
4	370	2999856.30	714761.59	Vegetation	82	-10	20:1 (off airport)
4	371	2999912.60	714726.59	Vegetation	83	-9	20:1 (off airport)
4	373	2999874.36	714791.51	Vegetation	81	-12	20:1 (off airport)
4	375	2999885.65	714857.67	Vegetation	80	-13	20:1 (off airport)
4	653	2998808.42	715332.64	Vegetation	69	3	7:1 transitional
4	662	2998812.52	715374.80	Vegetation	71	-1	7:1 transitional
4	672	2998860.91	715395.15	Vegetation	84	12	7:1 transitional
4	681	2998888.13	715418.48	Vegetation	80	9	7:1 transitional
4	685	2998870.81	715462.04	Vegetation	80	2	7:1 transitional
4	693	2998870.32	715506.24	Vegetation	75	-9	7:1 transitional

L.G HANSCOM FIELD COMPOSITE SURFACE ANALYSIS TO RUNWAY 23

REMOVAL AREA	TAG ID	NORTHING	EASTING	DESCRIPTION	OBS. HEIGHT	PENETRATION	CRITICAL SURFACE
4	696	2998913.56	715455.54	Vegetation	91	17	7:1 transitional
4	711	2998951.35	715476.45	Vegetation	84	10	7:1 transitional
4	715	2998907.63	715556.72	Vegetation	75	-12	7:1 transitional
4	718	2998953.07	715516.63	Vegetation	88	9	7:1 transitional
4	720	2998933.79	715552.79	Vegetation	81	-3	7:1 transitional
4	735	2998979.68	715557.00	Vegetation	83	2	7:1 transitional
Obstruction Lights							
pole	189	2998272.90	714726.02	Pole	59	27	34:1 (on airport)
pole	248	2998407.60	714789.71	Pole	59	27	34:1 (on airport)
pole	270	2998540.74	714858.78	Pole	44	14	34:1 (on airport)
pole	286	2998648.24	714963.26	Pole	56	22	34:1 (on airport)
pole	305	2998754.97	715074.75	Pole	48	-12	20:1 (off airport)
pole	608	2998754.97	715074.75	Pole	48	8	34:1 (off airport)
pole	640	2998857.25	715176.67	Pole	51	7	34:1 (off airport)
pole	677	2998958.60	715281.30	Pole	49	1	34:1 (off airport)
pole	723	2999067.70	715392.98	Pole	59	4	34:1 (off airport)

Appendix 3

SVMP Plan